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CRACKLE LACQUER  
[Reisslack]

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This invention relates to a coating system with a crackle lacquer structure or leather imitation.

The crackle lacquer technique is an old decorative technique in which a coating applied on an undersurface shows an interesting crackled pattern. This optically pleasing appearance of coatings is based on the applied coating cracking or breaking and forming islands as a pattern is created, from where the name "crackle lacquer" originates.

In the past, coating systems with a crackle lacquer structure using lacquers based on organic solvents, linseed oil stains and dextrin, etc. were used. Conventional crackle lacquer coatings were put together individually by the workers, but had a nonuniform pattern and were difficult in product handling.

The object of the invention is to make available a coating system with which a uniform and simple crackle lacquer structure or leather imitation which can be efficiently produced is ensured.

The object is achieved by a coating system which comprises at least one water-based ground coating and one water-based cover coating formed on the ground coating, the ground coating being more elastic than the cover coating, and the cover coating having been applied to the ground coating before the ground coating dries through and sets, and hardening with more stress than the ground coating.

The special advantage of the coating system as claimed in the invention is that the crackle lacquer structure can be prepared with a type of "memory" so that the desired cracking can be influenced and

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\* Numbers in the margin indicate pagination in the foreign text.

reproduced in a specific manner, therefore can be controlled. Furthermore, with this invention it has been possible for the first time to build up a crackle lacquer coating on a water-based coating system so that the coating as claimed in the invention, in contrast to conventional solvent-containing products, is far easier to use and environmentally greener.

The important components of the coating as claimed in the invention are the ground coating and the cover coating, the two coatings being synthesized on a water basis. Components of the ground and cover coating are accordingly the corresponding binders which are dispersed or emulsified in water or in primarily aqueous solutions. For the desired cracking it is necessary for the materials for the respective ground or cover coatings to be chosen such that the film of the ground coating is more elastic, in other words, softer or with lower stress, than the film of the cover coating, while the cover coating whose resin mixture has been applied to the ground coating before the latter dries through or sets hardens with more stress than the ground coating.

To meet these material requirements, the following measures can be used:

On the one hand, the required ratio of ground coating to cover coating can be set with respect to elasticity by using the correspondingly more or less elastic binders or corresponding, elasticity-modifying additives such as for example softeners and fillers. In this connection the use of the respective binders of the individual layers can be based on a dispersion of individual resin components or a dispersion combination of various resin components.

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On the other hand, the hardening property of the respective resin composition for the ground and cover coating, which property is determined by the type of raw material used, is of importance:

The resin mixture of the ground coating dried or hardens afterwards, preferably oxidatively, slowly and elastically, while the resin mixture of the cover coating physically dries or hardens extraneously crosslinked or self-crosslinked in a chemically reactive manner. During drying or hardening, the cover coating which is forming builds up stress which then leads to crack formation as a result of the stress difference from the ground coating. This is followed by formation of islands of the cover coating which "float" on the ground coating so that the desired crackle lacquer structure is formed. In addition to the known crackle lacquer structure, this coating system also yields a leather imitation.

The binder resin for the ground coating is preferably an alkyde resin which hardens under oxygen oxidation. Mixed binder systems are also well suited to this purpose, especially alkyde resin/acrylic resin mixtures being noteworthy. But other corresponding polymer dispersions are also suitable. Cracking can be easily influenced in a predetermined manner by using the corresponding water-based ground coating binder system, and cracking can be determined especially by the alkyde resin types used, short-oil or long-oil, on the one hand, and by the quantitative ratio of acrylate resin and alkyde resin used or other polymer combination in the dispersion mixture. For example, the crack structure is coarsely pronounced when using a pure alkyde resin binder, while the crack structure using a binder mixture of fatty isophthalic acid alkyde resin and pure acrylate is more finely pronounced. /4

The dispersion for the ground coating in addition to the water base can also contain organic solvent components. Furthermore, in addition to the above described binder components and optionally the elasticity-modifying additives, other conventional coating components such as thickeners, fillers, pigments (for example iron oxide pigments, titanium dioxide, carbon black, lightfast organic pigments and the like), siccative ingredients (for example fungicides, etc.) can be contained.

As dispersions for the cover coating, due to easily adjustable and easily reproducible cracking, acrylate dispersions, polyurethane dispersions (single-component and two-component), polymer dispersions, as well as acrylate combination dispersions are especially well suited, the acrylates comprising both pure acrylates and also acrylic copolymers. But dispersions of other polymers which physically dry or harden or which are self-crosslinking or extraneously crosslinking are also suitable.

Examples of preferred acrylate combination dispersions are aqueous blends of polyacrylates and acrylic copolymers and polyurethanes. Self-crosslinking cover coating types are well suited to setting a harder or more brittle film property compared to the ground coating.

In addition to the water base which can contain a certain proportion of organic solvents, as well as the aforementioned binder resins and optionally elasticity-modifying additives, the dispersion for the ground coating can furthermore contain other conventional coating components, especially pigments, etc.

A further, easily adjustable and easily reproducible variable of the desired crack structure arises from the applied layer thicknesses /5

both of the ground coating and also of the cover coating. Thus, thick layers yield wide cracks and thin layers yield narrow cracks. Furthermore, by varying the different layer thicknesses on a given area an additional variation of effect in the crack structure can be produced. Other variables which influence the crack structure are the individual process parameters in the production of the coating system as claimed in the invention, especially atmospheric humidity, temperature, waiting times between applications of the individual layers, internal and external action of heat, compressed air, and air supply. It is especially favorable in this connection that when the above described material properties are observed with respect to the ground and cover coating and with simultaneous adherence to the parameters which have been set at the time (layer thicknesses in and of themselves, variation of layer thicknesses, process parameters) cracking can always be reproduced in a specific manner and can be easily set by the user.

The formation of the color of the respective ground and cover coating which is produced by the respective pigmenting can be selected depending on the desired color formation of the crackle lacquer structure or leather imitation. Thus, the coating system as claimed in the invention enables any combinations of colorless and colored ground and cover layers, which combinations are independent of one another.

One preferred configuration of this invention is that the coating system as claimed in the invention has been subjected to further surface treatment. This applies especially to additional decorative treatments with the formation of a patina, with application of other glazes or cover lacquers. The sealing of the surface with a

corresponding surface coating is a further advantageous configuration of the coating system as claimed in the invention in order to provide the coating system with greater mechanical loading capacity. For this purpose the coating system can be for example sealed with a single-component or dual-component parquet lacquer or a coating, water-based or solvent-based, on the basis of alkyde polyurethane resins, alkyde resins, self-crosslinking or extraneously crosslinking polyurethane resins, acrylate resins, epoxy resins, DD-lacquers, powder coatings or UV-hardening coating systems as a wear layer. /6

The coating system as claimed in the invention as desired can be applied to any undersurface, all conventional materials such as wood, metal, plastic, mineral undersurfaces, as well as old coatings or new coatings can be used as the undersurface. Furthermore, between the undersurface and the ground coating of the coating system as claimed in the invention there can be another coating of any configuration as the pretreatment of the undersurface. It can be used for example to improve adhesion of the coating on the undersurface. Furthermore, other optically interesting, aesthetic effects can be formed by coloring a translucent primer coating.

The hue of the undersurface/undersurface pretreatment yields the hue of the cracks. They can thus be controlled by coloring the undersurface. For a glazing ground coating and colorless cover coating, the overall color impression is also determined by the hue of the undersurface.

The coating as claimed in the invention can be produced as follows:

The ground coating can be rolled, brushed, spotted or sprayed. /7  
Here working on vertical and hanging surfaces is possible, but working on a horizontal surface is simplest. By adding thickeners, for example bentone pastes, working the ground coating on vertical surfaces can be facilitated. Likewise preliminary fogging of the vertical surface with the ground coating can effect better stability of the coating. Before the cover coating is applied to the ground coating, the ground coating can be hardened, but not dried through. This can be recognized most easily in that the surface of the ground coating becomes slightly dull. This is generally the case in a normal climate (20 degrees C/60% relative atmospheric humidity) after roughly 3 - 20 minutes. Then the cover coating is applied to the ground lacquer. This is done best by spraying. All current spraying processes are fundamentally suited. The best spray result is however achieved using a low pressure process.

The invention is detailed using the following examples with reference to the attached figure, the figure showing aesthetic crack structures of varying fineness, which were obtained in examples 1 to 3.

Example 1:

Undersurface: white

lightly grind and degrease melanin resin-precoated plates.

Ground coating: Application of ground coating 1 x BONDEX<sup>R</sup>-futur (alkyde resins in an aqueous emulsion) colored blue, covering with the mixed system BONDEX<sup>R</sup> 3D in one spray step (1/2 pass) in a low pressure process:

nozzle size 1 mm

wet application amount: 40 ml/m<sup>2</sup>

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airing time with air support 3 min.

Cover coating: Application of cover coating BONDEX<sup>R</sup>-parquet lacquer (aqueous acrylate/polyurethane dispersion) lustrous, colorless in one spray step (1/2 pass) in a low pressure process:

nozzle size 1 mm

wet application amount: 20 ml/m<sup>2</sup>

Result: fine cracking (leather effect), see figure

#### Example 2:

Undersurface: white, synthetic resin-coated

grind lightly

Ground coating: Application of ground coating 1 x BONDEX<sup>R</sup>-futur (alkyde resins in an aqueous emulsion) colored blue, covering with the mixed system BONDEX<sup>R</sup> 3D in one spray step (1/2 pass) in a low pressure process:

nozzle size 1 mm

wet application amount: 60 ml/m<sup>2</sup>

airing time with air support 5 min.

Cover coating: Application of cover coating BONDEX<sup>R</sup>-parquet lacquer (aqueous acrylate/polyurethane dispersion) lustrous, colorless in one spray step (1/2 pass) in a low pressure process:

nozzle size 1 mm

wet application amount: 35 ml/m<sup>2</sup>

Result: medium cracking (cowhide leather effect), see figure.

#### Example 3:

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Undersurface: white, acrylic lacquer-coated

grind lightly

Ground coating: Application of ground coating 1 x BONDEX<sup>R</sup>-futur colored

blue, covering with the mixed system BONDEX<sup>R</sup> 3D in one spray step (1/2 pass) in a low pressure process:

nozzle size 1 mm

wet application amount: 100 ml/m<sup>2</sup>

airing time with air support 7 min.

Cover coating: Application of cover coating BONDEX<sup>R</sup>-parquet lacquer lustrous, colorless in one spray step (1/2 pass) in a low pressure process:

nozzle size 1 mm

wet application amount: 50 ml/m<sup>2</sup>

Result: very coarse cracking (cowhide leather effect), see figure.

1. Coating system with a crackle lacquer structure or leather imitation, characterized by a water-based ground coating and a water-based cover coating formed on the ground coating, the ground coating being more elastic than the cover coating, and the cover coating having been applied to the ground coating before the ground coating dries through and sets, and hardening with more stress than the ground coating.

2. Coating system as claimed in Claim 1, wherein the ground coating is a coating which dries or hardens elastically under oxygen oxidation, based on a binder resin dispersed or emulsified in an aqueous medium, and wherein the cover coating is a physically drying or hardening or self-crosslinking or extraneously-crosslinking coating, likewise based on a binder resin which is dispersed or emulsified in an aqueous medium.

3. Coating system as claimed in Claim 2, wherein the binder resin of the ground coating is an alkyde resin or an alkyde/acrylate resin mixture.

4. Coating system as claimed in Claim 3, wherein the crackle lacquer structure or leather imitation is determined by short-oil or long-oil alkyde resin types or by the quantitative ratio of acrylate resin to alkyde resin.

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5. Coating system as claimed in one of the preceding Claims 1 to 4, wherein the cover coating is based on acrylate resin or polyurethane resin dispersed or emulsified in an aqueous medium or a mixture of polyurethane resin with acrylate resin as the binder resin.

6. Coating system as claimed in Claim 5, wherein the binder resin

is a dispersion mixture of acrylate resin and polyurethane resin.

7. Coating system as claimed in one of the preceding claims, wherein it furthermore has a surface coating.

8. Coating system as claimed in one of the preceding claims, wherein it furthermore has a decorative or sealing surface coating.

9. Coating system as claimed in one of the preceding claims, wherein the coating is applied on an undersurface of wood, metal or plastics.

10. Coating system as claimed in Claim 9, wherein a primer coating is formed between the undersurface and the ground coating.

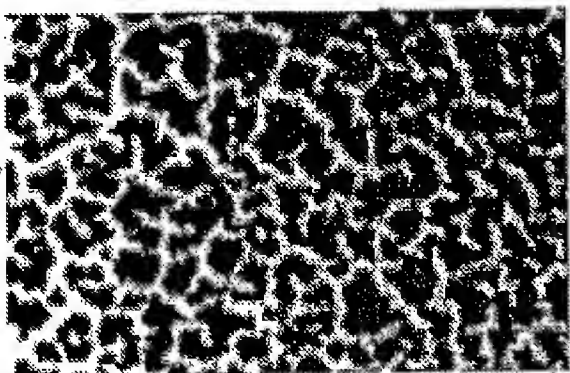
11. Coating system as claimed in Claim 10, wherein the primer coating is colored.

12. Coating system as claimed in one of the preceding claims, /12 wherein the ground coating and the cover coating are each made colorless, glazing or covering in the same or different colors independently of one another.

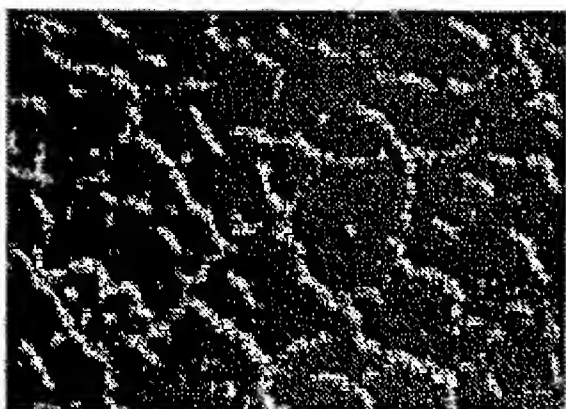
13. Coating system as claimed in one of the preceding claims, wherein the coating system is sealed with a parquet lacquer or a coating water-based or solvent-based on the basis of alkyde polyurethane resins, alkyde resins, self-crosslinking or extraneously-crosslinking polyurethane resins, acrylate resins, epoxy resins, DD-lacquers, powder coatings or UV-hardening coating systems as a wear layer to protect the crackle lacquer coating.

14. Coating system as claimed in one of the preceding claims, wherein the crack coloring is based on coloring of the undersurface with a coating.

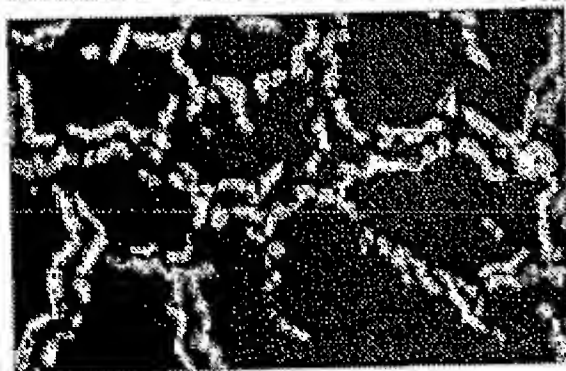
Figure 1



Example 1  
fine structure



Example 2  
medium structure



Example 3  
coarse structure